

Environmental Protection Agency

§ 86.107-98

the point-source method without heating sample lines or pumps.

(2) The running loss fuel vapor sampling system shall be a CFV- or PDP-based dilution and measurement system that further dilutes the running loss fuel vapors collected by the vapor vent collection system(s) with ambient air, collects continuously proportional samples of the diluted running loss vapors and dilution air in sample bags, and measures the total dilute flow through the sampling system over each test interval. In practice, the system shall be configured and operated in a manner that is directly analogous to an exhaust emissions constant volume sampling system, except that the input flow to the system is the flow from the running loss vapor vent collection system(s) instead of vehicle exhaust flow. The system shall be configured and operated to meet the following requirements:

(i) The running loss fuel vapor sampling system shall be designed to measure the true mass of fuel vapor emissions collected by the running loss vapor vent collection system from the specified fuel vapor vents. The total volume of the mixture of running loss emissions and dilution air shall be measured and a continuously proportioned sample of volume shall be collected for analysis. Mass emissions shall be determined from the sample concentration and total flow over the test period.

(ii) The PDP-CVS shall consist of a dilution air filter and mixing assembly, heat exchanger, positive-displacement pump, sampling system, and associated valves, pressure and temperature sensors. The PDP-CVS shall conform to the following requirements:

(A) The gas mixture temperature, measured at a point immediately ahead of the positive-displacement pump, shall be within ± 10 °F of the designed operating temperature at the start of the test. The gas mixture temperature variation from its value at the start of the test shall be limited to ± 10 °F during the entire test. The temperature measuring system shall have an accuracy and precision of ± 2 °F.

(B) The pressure gauges shall have an accuracy and precision of ± 1.6 inches of water (± 0.4 kPa).

(C) The flow capacity of the CVS shall not exceed 350 cfm.

(D) Sample collection bags for dilution air and running loss fuel vapor samples shall be sufficient size so as not to impede sample flow.

(iii) The CFV sample system shall consist of a dilution air filter and mixing assembly, a sampling venturi, a critical flow venturi, a sampling system and assorted valves, and pressure and temperature sensors. The CFV sample system shall conform to the following requirements:

(A) The temperature measuring system shall have an accuracy and precision of ± 2 °F and a response time of 0.100 seconds of 62.5 percent of a temperature change (as measured in hot silicone oil).

(B) The pressure measuring system shall have an accuracy and precision of ± 1.6 inches of water (0.4 kPa).

(C) The flow capacity of the CVS shall not exceed 350 cfm.

(D) Sample collection bags for dilution air and running loss fuel vapor samples shall be of sufficient size so as not to impede sample flow.

(3) An on-line computer system or strip-chart recorder shall be used to record the following additional parameters during the running loss test sequence:

(i) CFV (if used) inlet temperature and pressure.

(ii) PDP (if used) inlet temperature, pressure, and differential pressure.

[58 FR 16027, Mar. 24, 1993, as amended at 59 FR 48505, Sept. 21, 1994; 60 FR 34335, June 30, 1995; 60 FR 43888, Aug. 23, 1995]

§ 86.107-98 Sampling and analytical system.

Section 86.107-98 includes text that specifies requirements that differ from § 86.107-96. Where a paragraph in § 86.107-96 is identical and applicable to § 86.107-98, this may be indicated by specifying the corresponding paragraph and the statement “[Reserved]. For guidance see § 86.107-96.” Where a corresponding paragraph of § 86.107-96 is not applicable, this is indicated by the statement “[Reserved].”

(a)(1)-(a)(3) [Reserved]. For guidance see § 86.107-96.

(a)(4) *Refueling emissions test.* The requirements detailed in § 86.107-90 (a)(1)

shall apply. Alternatively, an enclosure meeting the specifications detailed in § 86.107-96 (a)(1), (2), or (3) may be used if approved in advance by the Administrator. In addition, the enclosure shall have one or more access ports leading to flexible, automatic sealing boots, in the wall(s) of the enclosure. The function of the access port(s) and boots shall be to allow fueling of the test vehicle from a fuel nozzle and hose located outside of the enclosure, with only the spout of the nozzle passing through the automatic sealing opening of the boot during fueling. There shall be no loss in the gas tightness of the enclosure at the opening of the boot either when the nozzle is inserted or when the nozzle is not inserted.

(b)-(d) [Reserved]. For guidance see § 86.107-96.

(e) *Temperature recording system*—(1) *For all emission testing.* A strip chart potentiometric recorder, an on-line computer system, or other suitable means shall be used to record enclosure ambient temperature during all evaporative emission test segments, as well as vehicle fuel tank temperature during the running loss test. The recording system shall record each temperature at least once every minute. The recording system shall be capable of resolving time to ± 15 s and capable of resolving temperature to ± 0.75 °F (± 0.42 °C). The temperature recording system (recorder and sensor) shall have an accuracy of ± 3 °F (± 1.7 °C). The recorder (data processor) shall have a time accuracy of ± 15 s and a precision of ± 15 s. Enclosures shall be equipped with two ambient temperature sensors, connected to provide one average output, located 3 feet above the floor at the approximate mid-length of each side wall of the enclosure and within 3 to 12 inches of each side wall. For diurnal emission testing, an additional temperature sensor shall be located underneath the vehicle to provide a temperature measurement representative of the temperature of the air under the fuel tank. For running loss testing, an ambient temperature sensor shall be located at the inlet to the fan that provides engine cooling. Manufacturers shall arrange that vehicles furnished for testing at federal certification facilities be equipped with temperature

sensors for measurement of fuel tank temperature. Vehicles shall be equipped with 2 temperature sensors installed to provide an average liquid fuel temperature. The temperature sensors shall be placed to measure the temperature at the mid-volume of the liquid fuel at a fill level of 40 percent of nominal tank capacity. An additional temperature sensor may be placed to measure vapor temperatures approximately at the mid-volume of the vapor space, though measurement of vapor temperatures is optional during the running loss test. In-tank temperature sensors are not required for the supplemental two-diurnal test sequence specified in § 86.130-96 or for the refueling test specified in § 86.151-98.

(2) *Refueling emission testing only.* In addition to the enclosure ambient temperature recording system described in paragraph (e)(1) of this section, strip chart recorder(s) or automatic data processor shall be used to record vehicle soak area ambient temperature and dispensed fuel temperature at the nozzle during the test. The temperature recorder(s) or data processor shall record each temperature at least once every 20 seconds (the soak area ambient temperature recorder may be a continuous recording system). The recording system shall be capable of resolving time to ± 15 s and be capable of resolving temperature to ± 0.75 °F (0.42 °C).

(f)-(h)(3) [Reserved]. For guidance see § 86.107-96.

(h)(4) *Refueling emission test.* Blowers or fans must have a capacity of 0.8 ± 0.2 cfm per cubic foot of the nominal enclosure volume. Circulated air shall not be aimed directly at the vehicle.

(5) *Spilled fuel mixing blower; refueling emission test.* An explosion-proof blower of 100-200 ft³/min (2.8-5.7 m³/min) capacity is required to enhance mixing of vapors from spilled fuel through the enclosure atmosphere during tests. The discharge from this blower shall be directed toward the region of the enclosure floor where fuel spillage during fueling may occur.

(i) [Reserved]. For guidance see § 86.107-96.

(j) *Refueling equipment.* The refueling equipment shall consist of a fuel delivery system with temperature control

equipment, fuel flow safety switch, dispensing pump, hose, nozzle and a meter to measure the dispensed fuel volume. The dispensing nozzle shall be a commercial model, not equipped with vapor recovery hardware. A fuel recirculation system may be utilized to avoid trapping of unheated fuel in the hose. The fuel delivery system must be capable of delivering fuel at 67 ± 1.5 °F (19.4 ± 0.8 °C) and a constant flow rate between 4.2 and 9.8 gal/min (15.9 and 37.1 liter/min) with a tolerance of ± 0.3 gal/min (± 1.1 liter/min) during the refueling emissions measurement phase of the test. The accuracy of the meter for measuring the dispensed fuel volume shall be ± 2 percent at the test flow rate.

[59 FR 16295, Apr. 6, 1994, as amended at 60 FR 43890, Aug. 23, 1995]

§ 86.108-00 Dynamometer.

(a) The dynamometer shall simulate the road load force and inertia specified for the vehicle being tested, and shall determine the distance traveled during each phase of the test procedure.

(b) Two types of dynamometer roll configurations are currently approved by the Administrator:

(1) A small twin-roll dynamometer that has a nominal roll diameter of 8.65 inches and a nominal roll spacing of 17 inches; and

(2)(i) An electric dynamometer that has a single roll with a nominal diameter of 48 inches (1.20 to 1.25 meters).

(ii)(A) The dynamometer must be capable of dynamically controlling inertia load during the US06 test cycle as a function of a vehicle throttle position signal if a manufacturer desires using the following test option. Any time the duration of throttle operation greater than or equal to 85% of wide open throttle (WOT) is greater than or equal to eight seconds, the test inertia load may be adjusted during any of five EPA specified acceleration events by an amount of load that will eliminate additional throttle operation greater than or equal to 85% of WOT.

(B)(I) The specific US06 schedule accelerations time periods where inertia load adjustments may be applied are:

- (i) 49 through 69 seconds;
- (ii) 83 through 97 seconds;

- (iii) 135 through 165 seconds;
- (iv) 315 through 335 seconds; and
- (v) 568 through 583 seconds.

(2) During these five time intervals when inertia load adjustment is occurring, inertia load adjustment is discontinued when throttle operation is less than 85% of WOT or at the end of the specified time interval.

(C) Each type of generic application for implementing this concept must receive the Administrator's approval before a manufacturer may use these inertia adjustments for official US06 schedule certification tests.

(c) Other dynamometer configurations may be used for testing if it can be demonstrated that the simulated road load power and inertia are equivalent, and if approved in advance by the Administrator.

(d) An electric dynamometer meeting the requirements of paragraph (b)(2) of this section, or a dynamometer approved as equivalent under paragraph (c) of this section, must be used for all types of emission testing in the following situations.

(1)(i) Gasoline vehicles which are part of an engine family which is designated to meet the phase-in of SFTP compliance required under the implementation schedule of table A00-1 of § 86.000-08, or table A00-3, or table A00-5 of § 86.000-09.

(ii) Diesel LDVs and LDTs which are part of an engine family which is designated to meet the phase-in of SFTP compliance required under the implementation schedule of table A00-1 of § 86.000-08, or table A00-3, or table A00-5 of § 86.000-09.

(2) Starting with the 2002 model year, any light-duty vehicle or light light-duty truck which uses any regulated fuel.

(3) Starting with the 2004 model year, any heavy light-duty truck which uses any regulated fuel.

[61 FR 54890, Oct. 22, 1996]

§ 86.108-79 Dynamometer.

(a) The dynamometer shall have a power absorption unit for simulation of road load power and flywheels or other means of simulating the inertia weight as specified in § 86.129.